REMARKS

Claim Status

Claim 1 has been amended to recite the ratio range of beta glucan to lactoferrin contained in the composition and the specific form of the composition. Additionally, claims 1 and 16 have been amended to recite preferred concentration ranges of beta glucan and lactoferrin contained in the composition, and claims 17-18 have been amended to recite a preferred concentration of lactoferrin contained in the composition.

Support for the amendments can be found in Example 1 of the instant application, wherein 20 parts of beta glucan and 10 parts of bovine lactoferrin were placed in a mixer for preparation of a lozenge (i.e., composition in a mucosal delivery format) and in Example 2, wherein 20 parts of beta glucan and 10 parts of bovine lactoferrin were placed in a mixer for preparation of a gelatin capsule (i.e., composition in an encapsulated form). Support can further be found in Examples 3 and 4, wherein lozenges containing 20 mg beta glucan and 10 mg lactoferrin were administered to the patients. These exemplary formulations, either in a mucosal delivery format or in an encapsulated form, all contain beta glucan and lactoferrin in the ratio of 2:1.

As described on page 3, paragraph [0022] of the instant application (US 2002/0054917), mucosal delivery in the mouth is preferred over the gastric delivery of lactoferrin. Accordingly, gastric delivery in the form of an enteral feed preparation or the swallowing of a capsule requires approximately 150% of the amount of lactoferrin that could be delivered directly into the mouth. That is, for a composition in an encapsulated form, 50% more lactoferrin is required compared to a composition in a mucosal delivery format. In view of this, if a composition in a mucosal delivery format contains beta glucan and lactoferrin in a ratio of 2:1 (*See* Examples 1, 3 and 4), a

composition in an encapsulated form would contain beta glucan and lactoferrin in a ratio of 2:(1x150%), i.e., 2:1.5. If a composition in an encapsulated form contains beta glucan and lactoferrin in a ratio of 2:1 (*See* Example 2), a composition in a mucosal delivery format would contain beta glucan and lactoferrin in a ratio of 2:(1/150%), i.e., 2:2/3 (or about 2:0.7). The ratio range of the beta glucan and lactoferrin contained in the composition as claimed in claim 1 would be from about 2:1.5 to about 2:0.7. No new matter is introduced.

Regarding the preferred concentration range of beta glucan and lactoferrin contained in the compositions as claimed, Applicant submits that the support can be found in original claims 10 and 11, wherein the concentration range of about 0.25 weight percent to about 2.5 weight percent for lactoferrin and the concentration range of about 1 weight percent to about 10 weight percent for beta glucan were originally claimed. No new matter is introduced.

Claims 7, 10 and 11 have been cancelled in view of the above amendments.

Claims 2, 4 and 19-24 were previously cancelled.

Additionally, Applicant has renumbered misnumbered claims 19-33 from the Preliminary Amendment as 25-39 as requested by the Examiner. The renumbered claims 25-39 have now been withdrawn.

As amended, claims 1, 3, 5-6, 8-9 and 12-18 are pending in the present case.

Rejections under 35 U.S.C. §102

Claims 1, 3 and 5-15 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by WO97/08960, which corresponds to U.S. Patent No. 6,306,453 (referred to as US '453). Applicant respectfully traverses this rejection.

US '453 discloses an anti-stress feed comprising at least one vitamin and at least one immunostimulating agent such as glucan and lactoferrin, wherein the immunostimulating agent is present in an amount of from 0.0001 to 10% by weight and preferably 0.1% by weight. US '453 does not disclose a composition comprising beta glucan and lactoferrin in a ratio range of about 2:1.5 to about 2:0.7, wherein the concentration of lactoferrin is about 0.25 weight percent to about 0.908 weight percent. In fact, US '453 is totally silent on ratios of immunostimulating agents (if more than one is contained in the feed). Consequently, US '453 does not teach each and every element of the instant invention as claimed.

In view of the above remarks, US '453 does not anticipate the instant invention as claimed. Accordingly, this rejection should be traversed.

Claims 1, 5, 6, 8, 9, and 12-15 stand rejected under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. Patent No. 6,241,983 (referred to as US '983). Applicant respectfully traverses this rejection.

US '983 teaches a composition that contains a mixture of beneficial bacteria and dietary fiber. US '983 further teaches that the dietary fiber can be β-glucan and that the composition may further comprise about 0.0001% to about 0.1000% of lactoferrin (*See* claims 1, 2 and 21). US '983 does not teach a composition comprising beta glucan and lactoferrin in a ratio range of about 2:1.5 to about 2:0.7, wherein the concentration of lactoferrin is about 0.25 weight percent to about 0.908 weight percent. In fact, US '983 teaches away from the instant application by using lactoferrin of much lower concentration compared to that claimed in the instant application, i.e., about 0.0001% - 0.1000% taught in US '983 *vs.* about 0.25% - 0.908% claimed in the instant application.

In view of the above remarks, Applicant submits that US '983 does not anticipate the instant application as claimed and accordingly, requests that the rejection of claims 1, 5, 6, 8, 9, and 12-15 under 35 U.S.C. 102(e) be traversed.

Claims 1, 3, and 5-17 stand rejected under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. 2002/0119928 (referred to as US '928). Applicant respectfully traverses this rejection.

US '928 teaches a composition that comprises lactoferrin and beta-glucan (*See* claim 5), wherein lactoferrin can be present from 0.909 to 6.67 percent by weight (*See* claim 9). US '928 does not teach a composition comprising beta glucan and lactoferrin in a ratio range of about 2:1.5 to about 2:0.7, wherein the concentration of lactoferrin is about 0.25 weight percent to about 0.908 weight percent. Applicant presents the following analysis regarding the differences between US '928 and the instant application.

In the instant application, the proper amount and ratio of beta glucan to lactoferrin is 20 mg of beta glucan to 10 mg of lactoferrin whatever the carrier is in an encapsulated product, and the optimum amount and ratio of beta glucan to lactoferrin for a chewable or a lozenge is 20 mg of beta glucan to 7 mg of lactoferrin. It is the ratio of beta glucan to lactoferrin contained in the composition that is significant. The following Table 1 demonstrates an acceptable amount and ratio range as claimed in the instant application for a chewable or a lozenge of total weight of 1000 mg, 1500 mg or 2000 mg as an example:

TABLE 1

		Chewable or Lozenge Total Weight		
		@1000 mg	@1500 mg	@2000 mg
Beta glucan	14.3 mg	1.43 %	0.95%	0.715%
Lactoferrin	5 mg	0.50 %	0.33%	0.25%
	TO:			
		@1000 mg	@1500 mg	@2000 mg
Beta glucan	25.94 mg	2.594%	1.729%	1.297%
Lactoferrin	9.08 mg	0.908%	0.605%	0.454%

The following Table 2 demonstrates the amount and ratio range as claimed in US '928 for a chewable or a lozenge of a total weight of 1000 mg, 1500 mg or 2000 mg as an example:

TABLE 2

		Chewable or Lozenge Total Weight		
		@1000 mg	@1500 mg	@2000 mg
Beta glucan	0.001%	0.010 mg	0.015 mg	0.020 mg
Lactoferrin	0.909%	9.090 mg	13.635 mg	18.18 mg
	TO:			
		@1000 mg	@1500 mg	@2000 mg
Beta glucan	10.00%	100.0 mg	150.00 mg	200.0 mg
Lactoferrin	6.67%	66.7 mg	100.05 mg	133.4 mg

It appears that for a chewable or a lozenge of a total weight of 1000 mg, 1500 mg or 2000 mg, the composition claimed in US '928 contains at least 9.09 mg of lactoferrin. In contrast, the composition of the instant application contains less than 9.09 mg of lactoferrin and still maintains its efficacy.

Furthermore, Applicant believes the underlying mechanism on which US '928 is based is contradictory. Particularly, in paragraph [0028], US '928 discusses that beta glucan suppresses production of proinflammatory cytokines, especially TNF-α *in vitro* and *in vivo*. However, later in paragraph [0032], US '928 discusses that beta glucan may exert its anti-tumor effects by stimulating TNF-α release.

Beta glucan increases TNF-α and IL-6 production, whereas lactoferrin decreases TNF-α and IL-6 production. Any long term and continuous use of either beta glucan or lactoferrin alone would have detrimental effect of either sustained inflammation or decreased ability to fight cancer due to decreased TNF-α and IL-6 production. There exists a delicate balance between the use of beta glucan and the use of lactoferrin, which makes possible a long-term, e.g., two weeks, and safe administration of both beta glucan and lactoferrin. The instant application focuses on a specific ratio range of beta glucan to lactoferrin and a specific concentration range of lactoferrin to achieve that delicate balance. This specific ratio range of beta glucan to lactoferrin as well as the specific concentration range of lactoferrin is not taught in US '928. Consequently, US '928 does not anticipate the instant invention as claimed and accordingly, the rejection should be traversed.

Rejections under 35 U.S.C. §103

Claims 1, 7, 10, 11, 16, and 17 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over WO 97/08960, which corresponds to U.S. Patent No. 6,306,453 (referred to as US '453). Applicant respectfully traverses this rejection.

As discussed above, US '453 does not teach or suggest a composition comprising beta glucan and lactoferrin in a ratio range of about 2:1.5 to about 2:0.7, wherein the concentration of lactoferrin is about 0.25 weight percent to about 0.908 weight percent, as claimed in the instant application. Applicant asserts that the specific ratio of beta glucan to lactoferrin and specific concentration range of lactoferrin contained in the instant composition were not obvious in view of the negative side effects known in the art when administering either lactoferrin or β-glucan alone.

Lacking any suggestions regarding ratio of beta glucan to lactoferrin, US '453 does not render obvious the instant application as claimed. Consequently, this rejection should be traversed.

Claims 1, 3, 7, 10, 11, and 16-18 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,241,983 (referred to as US '983) in view of U.S. Patent No. 5,670,138 (referred to as US '138). Applicant respectfully traverses this rejection.

As discussed above, US '983 does not teach or suggest a composition comprising beta glucan and lactoferrin in a ratio range of about 2:1.5 to about 2:0.7, wherein the concentration of lactoferrin is about 0.25 weight percent to about 0.908 weight percent. In fact, US '983 teaches away from the instant application by using lactoferrin of much lower concentration compared to that claimed in the instant application, i.e., about 0.0001% - 0.1000% taught in US '983 *vs.* about 0.25% - 0.908% claimed in the instant application. Applicant asserts that US '983 in no way would motivate one of ordinary skill in the art to use lactoferrin having a totally different concentration range as an ingredient for the final composition.

Applicant further asserts that the ingredient ratios and concentrations are not routine. None of these factors claimed in the instant application were obvious in view of the negative effects of single administration of lactoferrin or β-glucan.

US '138 teaches mouth-care products comprising ingredients such as mannitol. US '138 does not teach or suggest a composition comprising beta glucan and lactoferrin. Applicant respectfully submits that the Examiner has not satisfied the burden of establishing a *prima facie* case of obviousness. Neither reference provides a motivation or suggestion to combine the teachings of US '983 and US '138 to support the composition suggested by the Examiner. Furthermore, even if one of ordinary skill in the art were motivated to combine the teachings of US '983 and US '138, he or she would not have produced the composition as claimed in the instant application due to the fact that US '983 teaches the use of lactoferrin having a much lower concentration range than that of the instant application. Consequently, US '983 in view of US '138 does not render obvious the instant application as claimed. Therefore, this rejection should be traversed.

Claims 1, 3, 7, 10, 11, and 16-18 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. 2002/0119928 (referred to as '928) in view of U.S. Patent No. 5,670,138 (referred to as '138). Applicant respectfully traverses this rejection.

As discussed above, US '928 does not teach or suggest the specific ratio range of beta glucan to lactoferrin as well as the specific concentration range of lactoferrin as claimed in the instant application. Applicant asserts that the ingredient ratios and concentrations are not routine. None of these factors claimed in the instant application were obvious in view of the negative effects of single administration of lactoferrin or β-glucan.

US '138 teaches mouth-care products comprising ingredients such as mannitol. US '138 does not teach or suggest a composition comprising beta glucan and lactoferrin. Applicant respectfully submits that the Examiner has not satisfied the burden of establishing a *prima facie* case of obviousness. Neither reference provides a motivation or suggestion to combine the teachings of US '928 and US '138 to support the composition suggested by the Examiner. Furthermore, even if one of ordinary skill in the art were motivated to combine the teachings of US '928 and US '138, he or she would not have produced the composition as claimed in the instant application. Consequently, US '928 in view of US '138 does not render obvious the instant application as claimed. Therefore, this rejection should be traversed.

* * * * * * *

In light of the above remarks, reconsideration and withdrawal of the outstanding rejections are respectfully requested. All arguments are made in a good faith effort to advance the prosecution on the merits. The Examiner is encouraged to call the undersigned should any further action be required for allowance.

This paper is being filed timely. No fee is believed to be due. However, should any fees be required for any reason relating to the enclosed materials, the Commissioner is authorized to deduct said fees from Howrey Deposit Account No. 01-2508/13479.0002.CPUS02.

Respectfully submitted,

J. Wendy Davis, Ph.D.
Reg. No. 46,393
AGENT FOR ASSIGNEE,
LACTOFERRIN PRODUCTS COMPANY

Customer No. 23369
Howrey LLP
2941 Fairview Park Drive, Box 7
Falls Church, VA 22042
(713) 787-1512 (direct line)
(703) 336-6950 (fax)

August 16, 2005